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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/032,906	12/28/2001	Steven M. Penn	TI-30544	9017
23494	7590	09/21/2004	EXAMINER	
TEXAS INSTRUMENTS INCORPORATED			ALLEN, DENISE S	
P O BOX 655474, M/S 3999			ART UNIT	
DALLAS, TX 75265			PAPER NUMBER	
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DATE MAILED: 09/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/032,906	Applicant(s) PENN, STEVEN M.	
	Examiner Denise S Allen	Art Unit 2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 and 23-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 and 23-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

In view of the Appeal Brief filed on June 18, 2004, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Applicant's arguments with respect to claims 1, 14, 15, 17, 31, and 32 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

Claims 1 – 20 and 23 – 32 are objected to because of the following informalities:

The limitation “a total internal reflection prism” (claims 1 and 17) is unclear because it implies a single prism and the applicant’s figure 1 shows a pair of prisms (reference 28).

Suggested correction: replace the limitation with “a total internal reflection prism assembly”.

The limitation “on said illumination and projection path” (claim 1) is unclear because it does not indicate how the prism is oriented with respect to the remaining elements of the image display system and it does not indicate how the prism affects the filtered light beam and the first

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and second light beams. Suggested correction: add claim limitations that define the relationship between the prism and the remaining elements of the image display system similar to the applicant's specification (page 9 line 1 – 3).

The limitation “The three dimensional image display system” (claims 2 – 16) lacks antecedent basis because it has not been previously recited. Suggested correction: replace the limitation “An image display system” (claim 1) with “A three dimensional image display system”.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 – 3, 5 – 7, 12, 16 – 19, 23, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii et al (US 5,552,840) in view of Budd et al (US 5,896,232).

Regarding claims 1 and 17, Ishii et al teaches an image display system (Figure 1) comprising: a light source (reference 1) for providing a beam of light along an illumination path; a sequential color filter (reference 13) on said illumination path for filtering said beam of light; a polarizing beam splitter (reference 70) on said illumination path for separating said filtered light beam into a first beam (reference a) having a first polarization state and a second beam (reference b) having a second polarization state; a first spatial light modulator (reference 12) receiving and selectively modulating said first beam; a second spatial light modulator (reference

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12') receiving and selectively modulating said second beam; and at least one projection lens (reference 5) on a projection path for focusing said first and second beams on an image plane (reference 6). Ishii et al does not teach a total internal reflection prism on the illumination and projection paths.

Budd et al teaches an image display system (Figure 8 and column 9 lines 18 – 64) that includes a total internal reflection prism (reference 220, also note the complimentary prism reference 240) located on the illumination path from a light source (reference 195') to a spatial light modulator (reference 140) and on the projection path from the spatial light modulator to the projection lens (reference 270). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the total internal reflection prism of Budd et al in the image display system of Ishii et al in order to make the image display system more compact light weight, efficient, and low cost (Budd et al column 9 lines 51 – 52).

Regarding claims 2 and 18, Ishii et al teach said polarizing beam splitter combining said modulated first and second light beams (reference c).

Regarding claims 3 and 19, Ishii et al teach said sequential color filter comprising a color wheel (Figure 4).

Regarding claim 5, Ishii et al teach at least one prism (reference 72) in said illumination and said projection paths for separating said filtered illumination light beam and said modulated light beam.

Regarding claim 6, Ishii et al teach a first prism (reference 72) in said illumination and said projection paths for separating said first beam directed to said first modulator and said modulated first beam from said first modulator; and a second prism (reference 73) in said

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illumination and said projection paths for separating said second beam directed to said second modulator and said modulated second beam from said second modulator.

Regarding claims 7 and 23, Ishii et al teach the modulated light from said first modulator (Figure 11 reference 118) passing through a first projection lens (reference 119) and light from said second modulator (reference 121) passing through a second projection lens (reference 122).

Regarding claims 12 and 29, Ishii et al teach the first modulator comprising a liquid crystal device (column 8 line 35).

Regarding claim 16, Ishii et al teach polarized eyewear for a viewer of said image display system (column 11 lines 47 – 48).

Claims 4 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii et al in view of Budd et al and further in view of Brennesholtz (US 6,285,415).

Ishii et al in view of Budd et al teaches an image display system as described above with a color wheel. Ishii et al and Budd et al do not teach a spiral color wheel.

Brennesholtz teaches a spiral color wheel (column 3 lines 56 – 62) used to sequentially filter colors in a projection system. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the spiral color wheel of Brennesholtz in the image display system of Ishii et al in view of Budd et al in order to increase the efficiency of the image display system (Brennesholtz column 2 lines 9 – 15).

Claims 8 – 11 and 24 – 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii et al in view of Budd et al and further in view of Gibbon et al (US 2003/0020809).

Regarding claims 8 – 10 and 24 – 27, Ishii et al in view of Budd et al teaches an image display system as described above. Ishii et al and Budd et al do not teach said first and second

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modulators are positioned such that pixelated images from said first and second modulators are offset by approximately one-half pixel in both a horizontal direction and a vertical direction at said image plane.

Gibbon et al teaches two modulators positioned such that pixelated images from the modulators are offset by approximately one-half pixel in both horizontal and vertical directions at said image plane (page 1 paragraph 0012). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the pixel arrangement of Gibbon et al in the image display system of Ishii et al in view of Budd et al in order to increase the image resolution (Gibbon paragraph 0012 lines 9 – 14).

Regarding claims 11 and 28, Ishii et al in view of Budd et al teaches an image display system as described above. Ishii et al and Budd et al do not teach the first modulator comprising a micromirror device.

Gibbon et al teaches an image display system with micromirror modulators (page 2 paragraph 0033). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the micromirror modulator of Gibbon et al in the image display system of Ishii et al in view of Budd et al in order to eliminate fixed pattern noise.

Claims 13 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii et al in view of Budd et al and further in view of Wang (US 6,097,456).

Ishii et al in view of Budd et al teaches an image display system as described above. Ishii et al and Budd et al do not teach a recycling integrator on said illumination path for homogenizing said light beam prior to said sequential color filter.

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Wang teaches a display system (Figure 1 reference 100) with a recycling integrator (reference 130) on an illumination path for homogenizing a light beam (column 3 lines 51 – 55) prior to a sequential color filter (reference 120). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the recycling integrator of Wang in the image display system of Ishii et al in view of Budd et al in order to have uniform light illumination (Wang column 3 lines 51 – 53).

Allowable Subject Matter

Claims 14, 15, 31, and 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 14, 15, 31, and 32 are allowable over the prior art for at least the reason the prior art fails to teach and/or suggest a recycling integrator comprising an integrating rod with a mirrored input aperture as set forth in the claimed combination.

Wang teaches a recycling integrator with a reflector at the input of an integrating rod. Wang teaches both solid and hollow integrating rods. In light of the applicant's arguments (Appeal Brief pages 10 – 12), the reflector is not considered to be an input aperture.

Dewald (US 2001/0008470) teaches a recycling integrator comprising an integrating rod with a mirrored input aperture. Dewald teaches both solid and hollow integrating rods. Dewald is not considered prior art under 35 U.S.C. 103(c).

Kato (US 2003/0086066) teaches a recycling integrator comprising a solid integrating rod with a mirrored input aperture. Kato is not considered prior art under 35 U.S.C. 102.

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Chang (US 6,533,427) teaches a recycling integrator comprising a hollow integrating rod with a mirrored input aperture. Chang is not considered prior art under 35 U.S.C. 102.

Kamijima (US 2004/0156212) teaches a recycling integrator comprising a hollow integrating rod with a mirrored input aperture. Kato is not considered prior art under 35 U.S.C. 102.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Denise S Allen whose telephone number is (571) 272-2305. The examiner can normally be reached on Monday - Friday, 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew A Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Denise S Allen
Examiner
Art Unit 2872


dsa


DREW A. DUNN
SUPERVISORY PATENT EXAMINER